REMARKS

Claims 1-8 are pending in the application. They stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stivers et al. (EP 842980 A2) in view of Farnham et al. (US 5,134,211 A).

There is a need for rubber articles, such as seals, that work well in both cold environments (< −10°C) and in high temperature environments (>200°C). Fluorinated and perfluorinated elastomers ("fluoroelastomers") are known to provide superior sealing properties in high temperature and in harsh chemical environments. However, fluoroelastomer articles may not seal well at temperatures less than −10°C because the glass transition temperature (T_g) of the elastomer is greater than the temperature of the environment.

Applicants' invention, as defined in claim 1, is a curable composition of a fluoroelastomer, a certain fluorinated polyether and a curing agent. The fluorinated polyether has an alcohol terminal group and a fluorinated allyl terminal group and is based on the repeating unit —$\{CF_2CFH\text{-}O\text{-}R_f\text{-}CF_2CH_2O\}_n$—. After extensive research, Applicants have surprisingly discovered that these polyethers are less fugitive (at high temperatures) from fluorinated elastomers and perfluorinated elastomers than are perfluorinated polyethers or other fluorinated polyethers of the prior art. As shown in the Examples, the instant compositions have better low temperature properties (i.e. lower T_g and lower TR-10) than do similar compositions, absent the fluorinated polyether. Yet, unlike prior art (per)fluorinated polyethers, most of the polyether employed in Applicants' claimed invention remains in the fluoroelastomer compositions, even when the compositions are heat aged at 250°C for 168 hours or when exposed to jet fuel for 168 hours at room temperature (see weight change values reported in Tables III and IV, pages 16 & 17).

Stivers et al. discloses curable fluoroelastomer compositions that employ fluorinated polyethers of either Class I: Z-Q-R_f-O-$(R_{fo})_n$-R_f-Q-Z , or Class II: Z-Q-R_f-O-$(R_{fo})_n$-R_f, wherein Z is a primary amino group or non-fluorinated allyl group that is reactive with the fluoroelastomer; Q is a divalent linking group; R_f is a non-branched, C_1-C_{20} perfluoroalkylene group; R_{fo} is a perfluoroalkyleneoxy group; n is between 0 and 30; and R_f is a non-branched, C_1-C_{10} fluoroalkyl group (page 3, line 56- page 4, line 21).

Applicants are unaware of any commercially successful products based on the disclosures in Stivers et al. This may be because polyethers such as those employed in Stivers

typically migrate out of fluoroelastomer articles when the articles are employed in environments having high temperatures and pressures. Articles lose their low temperature performance as the polyether migrates out of the articles during use.

Farnham et al. disclose the polyether that is employed in Applicants' claimed composition. The polyethers are said to be useful as lubricants, lubricant precursors, macromonomers and coatings (col. 5, lines 32-33). It is not disclosed or suggested that Farnham et al.'s polyethers could be employed in a fluoroelastomer composition as a non-fugitive additive for improving the low temperature sealing properties of the composition. Nor is it obvious from the disclosures in Farnham' et al. why the subject polyether might be better than other prior art polyethers at remaining within fluoroelastomer articles when in use in elevated temperature and pressure environments, thus maintaining the articles' low temperature performance.

Applicants respectfully traverse the examiner's rejection under 35 U.S.C. 103(a) based on the above arguments and the indicia of long felt, but unsatisfied need for the invention. Fluoroelastomer articles (e.g. seals) that have good physical properties and seal well at both low temperatures and high temperatures (e.g. in car engines that will be exposed to winter climates) have been sought for years. The Stivers et al. patent application has a priority date of 1991. Farnham et al. has a priority date of 1990. Since 1991, there have been several publications that disclose fluoroelastomers blended with various fluorinated polyethers in an attempt to produce rubber articles which can perform well at both low and high temperatures. Yet no one, until Applicants, employed the particular polyether of Farnham et al. in a blend with fluorinated or perfluorinated elastomers to make articles that maintain good properties at both low and high temperatures with minimal loss of polyether from the articles when exposed to high temperatures.

In view of the above remarks, Applicants believe that claims 1-8 are patentable and that the application is in condition for allowance. Reconsideration is requested.

Respectfully Submitted,

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Dated: October 27, 2005